

POWER ENTRY PANEL WITH INPUT TERMINAL BLOCK  
HAVING DIRECT CONNECTION

FIELD OF THE INVENTION

The present invention is related to a power entry panel  
5 for a power conditioner. More specifically, the present invention  
is related to a power entry panel for a power conditioner having an  
input terminal block directly connected and in contact with a  
mating connection.

BACKGROUND OF THE INVENTION

10 The telecommunication industry is currently driving the  
industry for higher density products, which in turn is driving up  
the requirement for system power delivery. Recent switch chassis  
density requires a level of power entry and delivery exceeding that  
of any other currently disclosed industry product. The traditional  
15 method of interconnection from input through to output terminals in  
a 150 Amp 48 V DC power delivery system would require the use of #2  
wires and/or bus bars utilizing an unacceptable quantity of 600 mm  
ETSI (incorporated by reference herein) compliant chassis real  
estate rendering the chassis space requirements inadequate for the  
20 remainder of system design. The present chassis power entry  
eliminates the use of any wires or bus bars. The present chassis  
power entry accomplishes the requirement for 150 Amps of 48 V DC  
power delivery without utilizing an unreasonable percentage of the  
600 mm ETSI compliant chassis real estate.

25 The present power entry panel is unique as an innovative  
hybrid of custom and industry available parts eliminating the use  
of any wires or bus bars. The design reduces the part count,  
complexity and quantity of interconnections used with traditional  
wire and bus bar assemblies, therefore reducing real estate  
30 requirements, cost and additionally improving performance.

SUMMARY OF THE INVENTION

The present invention pertains to a power entry panel for a power conditioner. The power entry panel comprises an input terminal block which receives power. The power entry panel  
5 comprises a mating connection for passing power from the input terminal block to the power conditioner. The mating connection is directly connected and in contact with the input terminal block.

The present invention pertains to an input terminal block for a power entry panel. The input terminal block comprises a  
10 terminal pin for conducting power adapted to be directly connected and in contact with a mating connection of the power entry panel. The input terminal block comprises a support block through which the terminal pin extends. The support block supports the terminal pin. The input terminal block comprises a filtering layer disposed  
15 on the support block for filtering power.

The present invention pertains to a method for transferring power. The method comprises the steps of receiving power at an input terminal block. There is the step of passing power from the input terminal block through a mating connection  
20 that the input terminal block is directly connected and in contact with to a power conditioner.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings, the preferred embodiment of the invention and preferred methods of practicing the invention are  
25 illustrated in which:

Figure 1 is a schematic representation of a perspective view of a power entry panel for a power conditioner of the present invention.

Figure 2 is a schematic representation of a right side  
5 view of the power entry panel.

Figure 3 is a schematic representation of a side exposed view of the input terminal block.

Figure 4 is a schematic representation of an overhead view of the input terminal block.

10 Figures 5 and 6 are schematic representations of perspective and side views of the earthground bus bar and pin, respectively.

15 Figures 7 and 8 are wire side and connection side views, respectively, of the power entry panel without the mating connections.

Figure 9 is an overhead view of the power entry panel.

Figure 10 is an exploded view of the support block and the mating connection.

20 Figure 11 is a schematic representation of a perspective rear view of a partially populated power entry panel.

#### DETAILED DESCRIPTION

Referring now to the drawings wherein like reference numerals refer to similar or identical parts throughout the several

views, and more specifically to figures 1, 2, 7-9 and 11 thereof, there is shown a power entry panel 10 for a power conditioner 12. The power entry panel 10 comprises an input terminal block 14 which receives power. The power entry panel 10 comprises a mating  
5 connection 16 for passing power from the input terminal block 14 to the power conditioner 12. The mating connection 16 is directly connected and in contact with the input terminal block 14.

Preferably, the power entry panel 10 includes a ground panel 18 to which the input terminal block 14 is in contact. The  
10 power entry panel 10 preferably includes an output connector 20 to which power from the power conditioner 12 is transmitted. Preferably, the output connector 20 is chassis ground to the ground panel 18.

The input terminal block 14 preferably includes at least  
15 one terminal pin 22 that directly connects and is in contact with the mating connection 16. Preferably, the input terminal block 14 includes a support block 24 through which the terminal pin 22 extends, as shown in figures 3, 4 and 10. The support block 24 supports the terminal pin 22 and isolates the terminal pin 22.

The terminal pin 22 preferably has a long end 26 and a  
20 short end 28. The support block 24 preferably has a wire side 30 and a connector side 32. The input terminal block 14 preferably includes a filtering layer 34 for filtering the power. The power filtering layer 34 is preferably disposed on the connection side.  
25 The long end 26 preferably extends from the connection side and connects with the mating connection 16, and the short end 28 preferably extends from the wire side 30 and connects with a power wire 36 to which power is delivered to the input terminal block 14. Preferably, the output connector 20 includes a bus bar 38, and a  
30 pin 40 which is press fit onto the bus bar 38 to form the chassis

ground, as shown in figures 5, 6 and 11. The input terminal block 14 preferably provides 150 amps of power.

The present invention pertains to an input terminal block 14 for a power entry panel 10. The input terminal block 14 comprises a terminal pin 22 for conducting power adapted to be directly connected and in contact with a mating connection 16 of the power entry panel 10. The input terminal block 14 comprises a support block 24 through which the terminal pin 22 extends. The support block 24 supports the terminal pin 22. The input terminal block 14 comprises a filtering layer 34 disposed on the support block 24 for filtering power.

The present invention pertains to a method for transferring power. The method comprises the steps of receiving power at an input terminal block 14. There is the step of passing power from the input terminal block 14 through a mating connection 16 that the input terminal block 14 is directly connected and in contact with to a power conditioner 12.

Preferably, there is the step of sending the power from the power conditioner 12 through an output connector 20. There is preferably the step of grounding the output connector 20 to a chassis ground panel 18. Preferably, the passing step includes the step of passing 150 amps of 48 V DC power from the input terminal block 14 through the mating connection 16 to the power conditioner 12.

In the operation of the invention, the traditional method of 150 Amps of 48 V DC power entry transition from outside chassis to power conditioner 12, would be to use an industry available connector set and industry available panel mounted terminals or terminal block and accomplish an interconnection between the two

with the use of #2 wires and/or bus bars. The power entry panel 10, shown in figures 1 and 2, utilizes a custom input power entry terminal block that transitions directly, in a unique way, to an industry available connector housing eliminating the wires and/or bus bars and their respective mechanical connections. The input terminal block 14, shown in figures 4 and 5, is designed to panel mount with the appropriate connection terminals for incoming power and ground feeds. Filtering capabilities are incorporated into the input terminal block 14 with a printed circuit board filter layer 34 according to well known filtering techniques. The power entry side of the industry available connector set is an Elcon Products International Co. quadpower pin housing. A unique aspect of this design is the elimination of the standard Elcon connector pin, utilizing the Elcon connector housing only as the mating connection 16. The pin requirements have been custom designed into a terminal pin 22 that transitions, with appropriately designed support structure, from the custom input terminal block 14 to the Elcon mating connection 16 housing.

Another unique aspect is the earth ground for the power conditioner 12 accomplished with a bus bar 38 incorporating Elcon # 12 pins 40 at the output connector 20 from PCM, as shown in figures 5, 6 and 7. Figures 3 and 4 show the Elcon pin requirements incorporated to design a terminal pin 22 for input terminal block 14 that would transition directly to the Elcon housing mating connection 16. The input terminal block and power entry assembly utilizes a two-piece rather than a one-piece pin design. The transition from input terminal block 14 to Elcon mating connection 16 housing included an offset dimension that is more effectively manufacturable in a two-piece terminal pin 22 design rather than a one-piece terminal pin 22 design.

Each input terminal block 14 has a pattern of 4 terminals that transition from a short end 28 to an internal Elcon mating connection 16 housing. There is an offset in these two patterns that requires the terminal pin 22 design to have 2 different axis.

- 5 This is accomplished with a 2 piece design. The terminal pin 22 was designed by duplicating the Elcon required features and incorporating the requirements necessary to transition from the input terminal block 14 to the Elcon mating connection 16 housing.

- 10 Although the invention has been described in detail in the foregoing embodiments for the purpose of illustration, it is to be understood that such detail is solely for that purpose and that variations can be made therein by those skilled in the art without departing from the spirit and scope of the invention except as it may be described by the following claims.